

Current Issues in PHARMACY

Qamar Uddin Ahmad



IIUM PRESS
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA



Current Issues in Pharmacy

Editor

Qamar Uddin Ahmed, PhD

Kulliyah of Pharmacy, International Islamic University Malaysia



IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Qamar Uddin Ahmed: Current Issues in Pharmacy

ISBN: 978-967-418-019-5

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

TABLE OF CONTENTS	Page
PREFACE	3
Chapter 1: Issues in Pharmacy Education	
<i>Tariq Abdul Razak</i>	5
Chapter 2: Direct-to-Consumer Advertising in Malaysia: Skirting the Regulations?	
<i>Syahiera Farhana Zakaria; Noordin Othman</i>	15
Chapter 3: Tobacco Control Education in Pharmacy: From Theory to Practice	
<i>Mohamad Haniki Nik Mohamed; Saraswathi Simansalam</i>	25
Chapter 4: Pharmaceutical Promotion: The Theoretical Framework of Regulation	
<i>Noordin Othman; Agnes Vitry; Elizabeth E. Roughead</i>	57
Chapter 5: The Challenge of Pharmaceutical Promotion Regulation in Malaysia	
<i>Noordin Othman; Agnes Vitry; Elizabeth E. Roughead</i>	70
Chapter 6: Innovations in the Delivery of Pharmaceutical Care	
<i>Nurdiana Jamil; Syahiera Farhana Zakaria</i>	88
Chapter 7: Microencapsulation of Gentamicin into PLGA-Chitosan Matrices	
<i>Anas Abdullah Hazim; Ahmad Fahmi Harun Ismail; Mohamed Awang; Farahidah Mohamed</i>	112
Chapter 8: Process Analytical Technology Based Monitoring and Control of Crystal Properties in Pharmaceutical Crystallisation Processes	
<i>Mohd Rushdi Abu Bakar; Zoltan Karman Nagy</i>	129
Chapter 9: Pharmaceutical Application of Solid Dispersion Technology in Improving Solubility of Poorly Soluble Drugs: A Review	
<i>Uttam Kumar Mandal</i>	156

Current Issues in Pharmacy

Chapter 10: Natural Surfactants for Pharmaceutical Emulsions	
<i>Hadi, J. N; Norazian M. Hassan; Kausar Ahmad</i>	178
Chapter 11: The Vascular Protective Effects of Polyphenols	
<i>Juliana Md Jaffri</i>	196
Chapter 12: The Stress and Free Radical towards Disease and Aging	
<i>May Khin Soe</i>	215
Chapter 13: Research and Development on Antidiabetic Herbs: Malaysia Perspective	
<i>Abdul Razak Kasmuri</i>	227
Chapter 14: <i>In Vitro</i> Activities of Malaysian Antidiabetic Plant Extracts on Adipocyte Cells	
<i>Muhammad Taher; Mohamed Zaffar Ali Mohamed Amiroudine; Deny Susanti</i>	238
Chapter 15: Herbs as Antimicrobial Remedies and the Scientific Evidences	
<i>Norazian M. Hassan; Qamar Uddin Ahmed</i>	249
Chapter 16: Phytochemical Screening Expedition 2009: Drug Discovery From Nature	
<i>Siti Zaiton, M. S; Norazian M. Hassan; Shamsul Khamis</i>	274
Chapter 17: Pharmacology, Phytochemistry, and Toxicity of <i>Rhazya Stricta</i> DECNE	
<i>Saifullah Khan; Farmanullah</i>	285
Chapter 18: Effect of Different Growth Regulators on Shoot Proliferation of Garlic (<i>Allium sativum</i> L.)	
<i>Santi Rosana; Retno A. Budi Muljono; Ishak</i>	305
Chapter 19: Metals in Herbal Formulations	
<i>A. B. M. Helal Uddin</i>	320
Chapter 20: Flavonoids: Future Pharmaceutical Agents	
<i>Qamar Uddin Ahmed</i>	333

CHAPTER 8

PROCESS ANALYTICAL TECHNOLOGY BASED MONITORING AND CONTROL OF CRYSTAL PROPERTIES IN PHARMACEUTICAL CRYSTALLISATION PROCESSES

Mohd Rushdi Abu Bakar¹; Zoltan Karman Nagy²

¹Department of Pharmaceutical Technology, Kulliyah of Pharmacy, International Islamic

University Malaysia, Kuantan, Pahang DM, Malaysia; ²Professor of Process Systems

Engineering, Department of Chemical Engineering, Loughborough University, Loughborough,

Leicestershire, LE11 3TU, United Kingdom

Introduction

Crystallization is an important unit operation used in a variety of industries. Its importance in the pharmaceutical industries is due to a large number of active pharmaceutical ingredients that are utilised in solid form. It is estimated that more than 80% of pharmaceutical products involve at least one crystallization step in their manufacturing process (Reutzel-Edens, 2006). The pharmaceutical crystallisation operation is often critical because it determines the product properties, such as the crystal size distribution, morphology and polymorphic form. These properties in turn influence the efficiency of the subsequent downstream operations, particularly filtration and drying. The properties also affect the therapeutic performance of the product, such as dissolution rate and bioavailability. A proper control of crystallization processes offers possibilities for improved process efficiency and better product quality.